

REMARKS

By the present amendment, claims 12 to 17 and 20-22 are pending in the application.

Support For Claims

Support for the limitation --hard metal core particles-- in amended independent claim 12 and dependent claims 20 and 21 may be found in the specification in original claim 8 and page 6, lines 29-33.

The term "hard metal" is a well established technical term in the art having the same specific meaning as "cemented carbide".

This term is well known to those skilled in the art.

Attached hereto as Attachment A is a copy of Dictionary Of Metallurgy, by D. Birchon, Philosophical Library Inc., 1965, p. 179 which contains the definition:

Hard Metal. Another name for cemented carbide material.

The term "hard metal" is hereinafter discussed in detail.

It is submitted that the term "hard metal" is well known to one skilled in the art and definite within the requirements of 35 U.S.C. §112, second paragraph.

In new claim 22, the particle size of 30 to 300 μm is disclosed in the specification, e.g., at page 3, lines 11-12.

New matter is not being presented by the present amendment.

§103

The following rejections were made in the Office Action mailed April 11, 2003.

Claims 12, 13 and 18-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted state of the art (specification pp. 1-2) in combination with U.S. Patent No. 6,015,586 to Omori et al.

Claims 14, 16 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted state of the art (specification pp. 1-2) in combination with Omori et al. and further combination with EP-911425A1.

Claim 15 was rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted state of the art (specification pp. 1-2) in combination with Omori et al., and further combination with EP-911425A1, U.S. Patent No. 5,516,586 to Singer et al., or U.S. Patent No. 3,754,976 to Babecki et al.

These rejections, as applied to the amended claims, are respectfully traversed.

Patentability

It is submitted that the present invention, defined by amended independent claim 12, is not disclosed or suggested by and is patentable over the cited references for the following reasons.

An important feature of the present invention is that the core particles of the solid plating material are made of hard metal in order to utilize the hard material's high specific gravity and high hardness that are necessary to destroy the passivation film of a separator thereby exposing the surface of the separator and to compulsorily deposit on the exposed surface of the separator the corrosion resisting metal coated on the solid plating material.

Omori et al. do not disclose or suggest this feature but, in contrast, use an iron core having a specific gravity and a hardness that are far lower than those of the hard metal core of the present invention. The attached reference figure (Attachment B) depicts the difference between the present invention and Omori et al. The high specific gravity and hardness of the hard metal core of the present invention is necessary to destroy the passivation film on a separator base. The iron core of Omori et al. having the far lower specific gravity and hardness cannot destroy the passivation film on a separator. Omori et al. considers nothing about a passivation film on a separator.

"Hard metal" is a well established technical term in the art having the same specific meaning as "cemented carbide" basically composed of a hard phase of metal carbide such as WC and a binder phase such as Co. A typical

chemical composition and properties of hard metal can be summarized as follows:

Chemical composition (wt%)

Total C	Free C	Co	W
5.50-6.00	0.10 max	5.00-8.00	86-89.5

Hardness: 1300-1500 (HV)

Specific gravity: 13.7 (for hard metal containing 88wt% WC having a specific gravity of 15.5 to 15.7).

Hard metal has thus in nature a specific gravity and a hardness that are higher than those of iron used in Omori et al. as exemplified below.

	Omori et al.	Present invention
Hardness	780HV	1300-1500HV(*)
Specific gravity	7.9(iron)	13.7(*)

(*) The above recited values

The chemical composition and hardness level of hard metal can be also seen from JIS H5501 as follows:

JIS No.	W	Co	C	HRA	Hardness (HV)
G1	89-92	3-5	5-7	>90	(>1233)
G2	87-90	5-7	5-7	>89	(>1167)
G3	83-88	7-10	4-6	>89	(>1167)
D1	88-92	3-6	5-7	>89	(>1167)
D2	86-89	6-8	5-7	>88	(>1100)
D3	83-87	8-11	4-6	>88	(>1100)

(The contents of W, Co and C are in wt% and the parenthesized hardness values in HV are converted from the hardness values in HRA).

The applicant's admitted state of the art and Omori et al. suggest nothing about the present inventive feature that the core particles of the solid plating material are made of hard metal having high specific gravity and high hardness in nature that are necessary to destroy the passivation film of a separator thereby exposing its surface and to compulsorily deposit on the exposed surface of the separator the corrosion resisting metal coated on the solid plating material.

Therefore, the present invention defined by independent claim 12 in the amended form is not disclosed or suggested by and is patentable over the applicant's admitted state of the art in combination with Omori et al.

Dependent claims 13-17 and 20-22, depending directly or indirectly from independent claim 12, have all of the features of amended independent claim 12 and therefore, are patentable for the same reasons as discussed above.

It is therefore submitted that amended independent claim 12, and claims 13-17 and 20-22 dependent thereon, are patentable.

Drawings

Form PTO-948, Notice of Draftsperson's Patent Drawing Review, was not attached to the Office Action. Applicants respectfully request to be advised of the status of the drawings in the next communication from the Patent and Trademark Office.

CONCLUSION

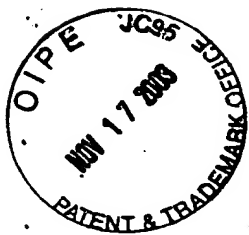
It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed to issue.

Respectfully submitted,

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ATTACHMENT A

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To
MARTIN JOHN

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Hard Metal

Hall Effect. If a conductor carrying an electric current is subjected to a magnetic field, a charge is developed on the conductor, perpendicular to the plane containing the direction of the current and the magnetic field, due to the displacement of the current carriers by the field. The polarity depends upon the type of current carrier and therefore provides a means of determining whether conduction is by holes or electrons in semi-conductors. The Hall coefficient is negative if conduction is by electrons.

Hall-Héroult Process. Electrolytic reduction of alumina to aluminium in carbon-lined vats. See **Aluminium**.

Hanover Metal. A bearing metal, 8% Sb, 5% Cu, balance Sn.

Hard Chromium. A heavy deposit of electrodeposited chromium to resist wear.

Hardenability. The ability of a steel to form martensite when quenched from the austenitic condition. It is therefore related to the size of section considered and is not concerned with the ultimate hardness value obtainable.

Hardenability is expressed quantitatively as the maximum diameter of round section which can be hardened right through by water-quenching. The amount of hardening on the central axis is usually defined as 50% martensite. Alternatively, it can be expressed as the maximum diameter of bar that can be hardened and tempered to give some selected combination of physical properties at a specified position in the cross-section. This is then referred to as the 'ruling section'.

Hardenability is usually measured by the *Jominy end-quench test*.

Hardener. A master-alloy used in adjusting the composition of a melt to a desired composition. The use of a hardener (containing a relatively large amount of the alloying element(s) required, alloyed with the major element in the final alloy) permits more accurate adjustment of composition than adding pure alloying elements to the melt.

Hard-facing. Depositing a hard metal (such as *Colmonoy* or *Stellite*) on the surface of another by fusion of the hard metal. See also **Flame-plating**.

Hard Lead. 7-25% Sb, lead alloys for battery plates and chemical plant.

Hard Magnetic Materials. Those in which the coercive force is high, giving a large magnetic hysteresis and a material suitable for permanent magnets. Often associated with physical hardness.

Hard Metal. Another name for *cemented carbide* material.

ATTACHMENT B

Omorí et al.

Projection

coating of zinc
(no passivation film)

base
No destroying passivation film

zinc plating

Present Invention

Projection

coating of corrosion resisting metal
core of hard metal
passivation film

separator
base
Destroying Passivation Film

Deposition

corrosion resisting plating